TouchKit
TouchScreen Controller
User Manual

for Windows CE

Version: 2.0.10

CONTENT

Chapter 1. Touch Panel Controller

This touch panel controller provides the optimistic performance of analog resistive touch panels for 4 wire, 5 wire and 8 wire models. It communicates with PC system directly through RS232, PS/2 or USB connector. Users can see how superior the design is in sensitivity, accuracy and friendly operation. The touch panel driver emulates mouse left and right button function and supports operation systems including Microsoft Windows 95 / 98 / ME / NT4 / 2000 / XP / XP Tablet PC Edition, Windows CE 2.12 / 3.0 / .NET, Linux, iMac and DOS.

1.1 Controller

Interface	RS232	USB	PS/2
4-wire	Ready	Ready	Ready
5-wire	Ready	Ready	Ready
8-wire	Ready	Ready	Ready
Capacitive	Ready	Ready	X

Table 1. Controllers match with different interfaces

1.2 Specifications and Features

Specifications	
Power requirements	+5VDC (Maximum 100mA, typical 70mA, 50mV peak to peak maximum ripple)
Operating temperature	0 to 50 ℃
Storage Temperature	-40 to 80 ℃
Relative Humidity	95% at 60 ℃
Protocol	RS232 Model: 9600 bauds, None parity, 8 data bits and 1 stop bit USB Model: USB 1.1 Low speed PS/2 Model: PS/2 mouse
Resolution	2048 X 2048
Report rate	RS232 Model: Max. 160 points/sec USB Model: Max. 160 points/sec PS/2 Model: Max. 140 points/sec
Response time	Resistive: Max. 35 ms Capacitive: Max. 20 ms
Pin out definition	4 wire model: X+, Y+, X-, Y- 5 wire model: UL, UR, COM, LR, LL 8 wire model: X+, X+ref, Y+, Y+ref, X- , X-ref, Y-, Y-ref
Panel resistance	4, 8 wire resistive model: 200 ~ 900 ohm (pin to pin on the same layer) 5 wire resistive model: 50 ~ 200 ohm (pin to pin on drive layer)
Regulatory Approvals	FCC-B, CE

Table 2. Specifications for **TouchKit** controller

Features	
Calibration	Fast full oriental 4 points position
Compensation	Accuracy 25 points linearity compensation.
Draw Test	Position and linearity verification
Language	Support 10 languages for Windows
Advanced Feature	1. Support monitor / display rotation 2. Support multiple monitor / display 3. Support QVGA and Half-VGA function 4. Support edge compensation 5. Support constant touch
Controller Setting	1. Support multiple controllers 2. Dynamical add / remove controllers 3. Change Controller interface without reboot.
Mouse Emulator	1. Right / Left button emulation 2. Normal / Click on touch / Click on release mode 3. Auto right button
Sound Notification	1. Sound option (No Sound / Touch Down / Lift Up) 2. Frequency adjustment 3. Duration adjustment
Double Click	1. Configurable double click speed 2. Configurable double click area
OS support	1. Windows 95 / 98 / ME / NT4 / 2000 / XP / Windows XP Tablet PC Edition 2. Windows CE 2.12 / 3.0 / .NET 3. Linux (RedHat / Fedora / Mandrake / Suse / YellowDog) 4. iMac. OS9.x / OSX 5. MS-DOS: Support display resolution: 320x200, 640x200, 640x350, 640x480, 800x600, 1024x768 and 1280x1024
COM port support	1. Support COM 1 ~ COM 256 for Windows and Linux 2. Support COM 1 ~ COM 8 for DOS

Table 3. Features for **TouchKit** software

Chapter 2. Installing TouchKit

TouchKit is software, which contains drivers, configuration and right button utilities of the touch panel controllers for RS232 and USB on x86 CPU and Windows CE operation system.

The two utilities are as follows:

- **Configuration support**
  The calibration and draw test of touch panel are done by this support.

- **Right button support**
  This is utility for emulating the right and left button of mouse through controlling touch panel. Users can toggle between right or left mouse buttons by this utility.

2.1 For Windows CE 2.12 / 3.0

There are totally five files in the **TouchKit** for Windows CE directory.
Follow these steps to install **TouchKit** for Windows CE.

TouchKit.dll	- driver
Touch32ex.dll	- specific dynamic linking library
TouchTray.exe	- right mouse support
TouchKit.exe	- Configuration Utility
TouchKit.reg	- information that will be added to registry

1. Make sure that Windows CE has the driver of serial ports.
2. While building Windows CE, users have to assign **TouchKit.dll, Touch32ex.dll, TouchTry.exe and Touchkit.exe** to appropriate directory.
3. Add some registry value as the content of **TouchKit.reg**.
4. Now, build Windows CE with this touch panel driver and utilities.

Note: TouchTray.exe is the file of the Right Mouse Utility. It has to be started with computer booting. So, put this file to appropriate directory to satisfy this specific request.

Now, users can boot this Windows CE version on specific device. The right mouse button utility will be emulated while computer booting and the touch panel driver is also ready.

2.2 For Windows CE.NET Stylus

There are two driver package versions and showed as below:

Use CE.NET bundle calibration utility
Use **Stylus** dedicated configuration utility.

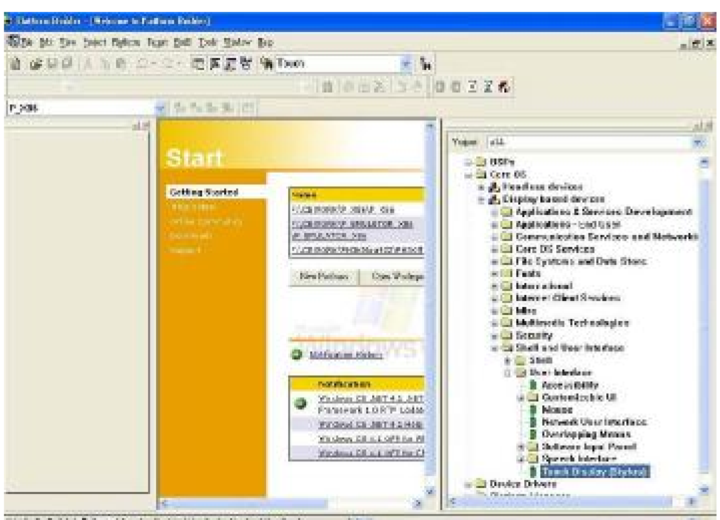
USB interface driver installation with CE.NET bundle calibration utility. File List:

USBPort.dll - USB touch screen driver
Touchp.dll - USB touch screen driver
Calibration.exe - provide a program of calibration (Programmer could choose the path while building the image of CE platform. This program is not necessary for CE.NET)

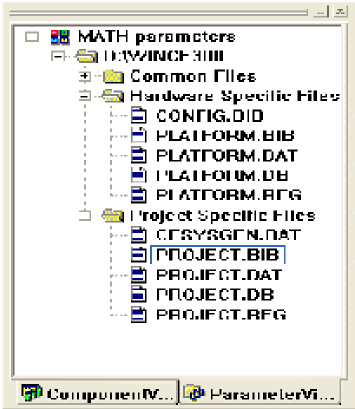
Note: Users select the UHCI or OHCI USB Host Controller driver into the platform, which supported by the target device, and check the USB mouse can go well at the same port.

Select the **Touch Display [stylus]** into the platform. Users can see:
"Catalog\Core OS\Display based devices\Shell and User Interface\Touch Display[Stylus]"

Select the **Mouse** into the platform. Users can see:
"Catalog\Core OS\Display based devices\Shell and User Interface\Mouse"



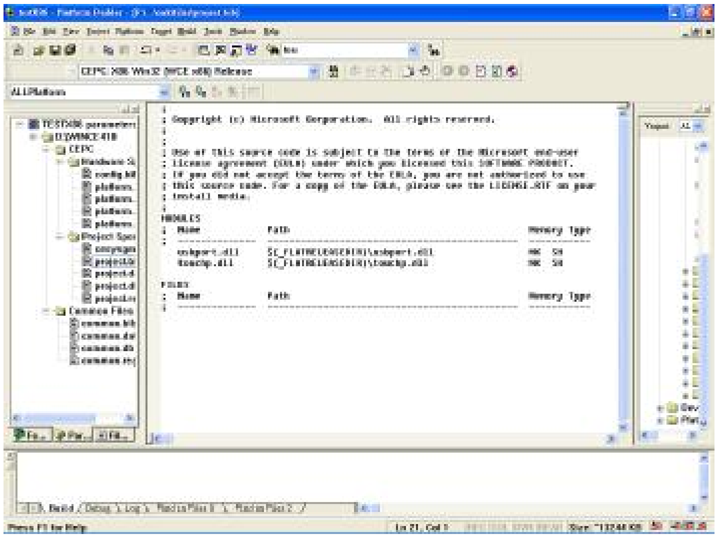
1. Create a sub-folder **"CEDB"** under **C:**
2. Copy files **USBPort.dll** and **Touchp.dll** to the directory.
3. Launch platform builder and open the platform workspace.
4. Edit the **PROJECT.BIB** in the Parameter View of Platform Builder.



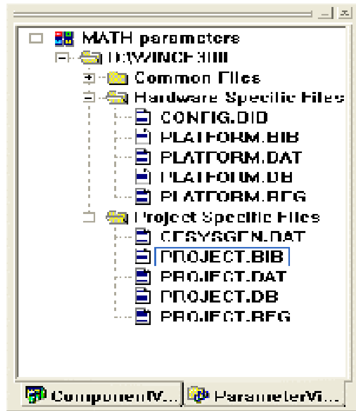
5. Add these two lines in Modules:

usbport.dll C:\CEDB\usbport.dll NK SH

touchp.dll C:\CEDB\touchp.dll NK SH

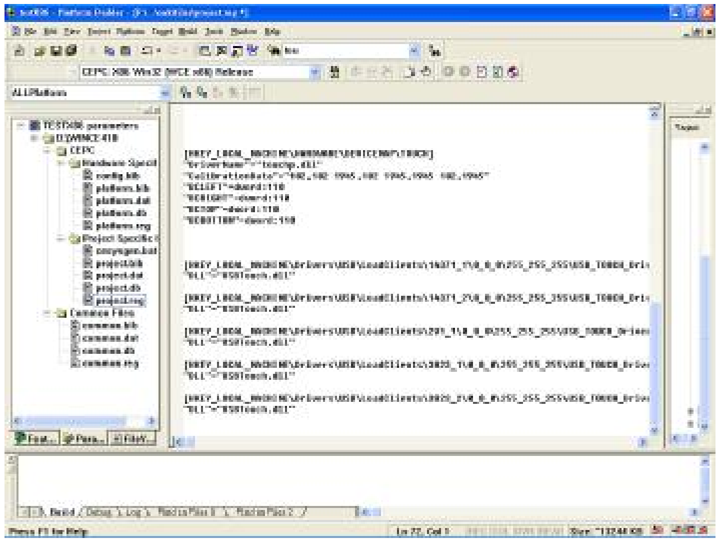


6. Edit the **PROJECT.REG** in the Parameter View of Platform Builder.

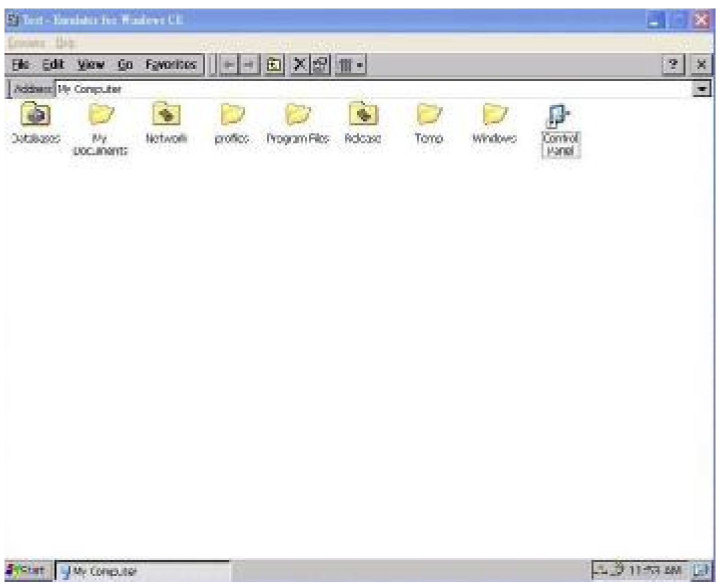


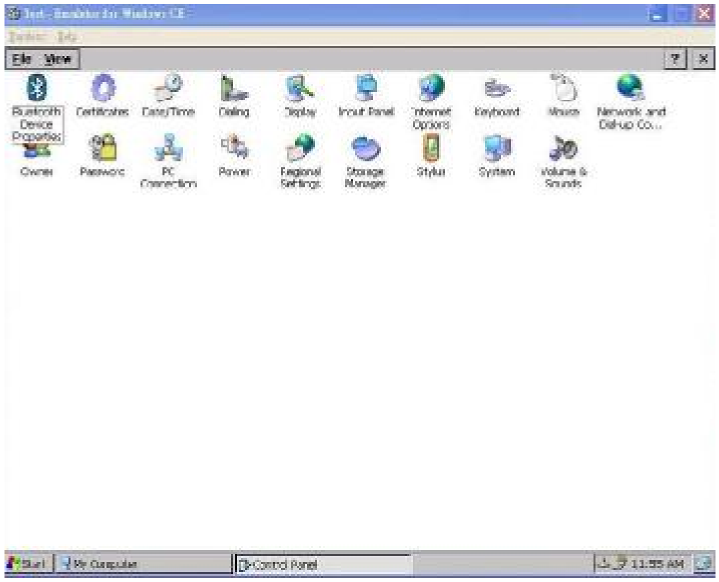
7. Add these lines for registry:
   [HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\TOUCH]
   “DriverName”=”Touchp.dll”
   “CalibrationData”=”102,102 1945, 102 1945,1945 102,1945”
   “BCLEFT”=dword:64
   “BCRIGHT”=dword:64
   “BCTOP”=dword:64
   “BCBOTTOM”=dword:64

   Then copy the following sentences to the **PROJECT.REG**
   [HKEY_LOCAL_MACHINE\Drivers\USB\LoadClients\14371_1\0_0_0\255_255_255\USB_TOUCH_Driver]
   “DLL”=”USBPort.dll”
   [HKEY_LOCAL_MACHINE\Drivers\USB\LoadClients\14371_2\0_0_0\255_255_255\USB_TOUCH_Driver]
   “DLL”=”USBPort.dll”
   [HKEY_LOCAL_MACHINE\Drivers\USB\LoadClients\4660_1\0_0_0\255_255_255\USB_TOUCH_Driver]
   “DLL”=”USBPort.dll”
   [HKEY_LOCAL_MACHINE\Drivers\USB\LoadClients\3823_1\0_0_0\255_255_255\USB_TOUCH_Driver]
   “DLL”=”USBPort.dll”
   [HKEY_LOCAL_MACHINE\Drivers\USB\LoadClients3823_2\0_0_0\255_255_255\USB_TOUCH_Driver]
   “DLL”=”USBPort.dll”



8. After building the image of CE.NET and load it to hardware platform. Users can use the stylus to do the calibration, which can be found in the control panel.







9. if the user wants to keep the calibration data after WINCE reboot, please write **WINCE REGISTRY** to FLASH or other storages on target.

RS232 interface driver installation with CE.NET bundle calibration utility. File List:

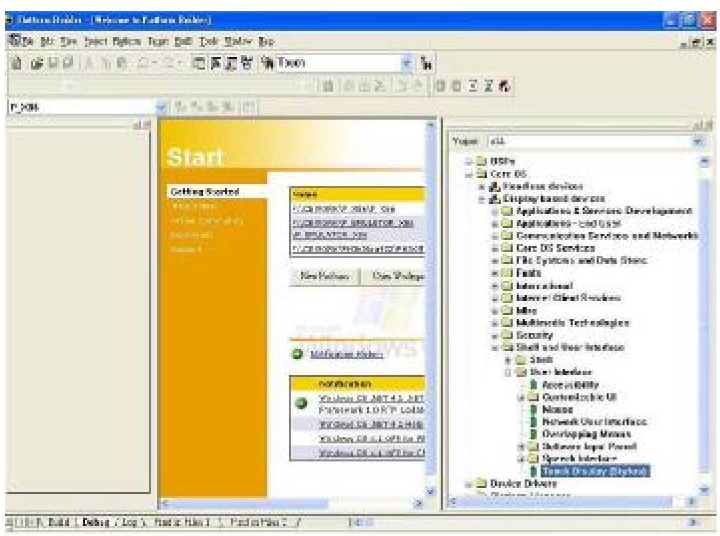
Touchp.dll - RS232 touch screen driver

Calibration.exe - provide a program of calibration (Programmer could choose the path while building the image of CE platform. This program is not necessary for CE.NET)

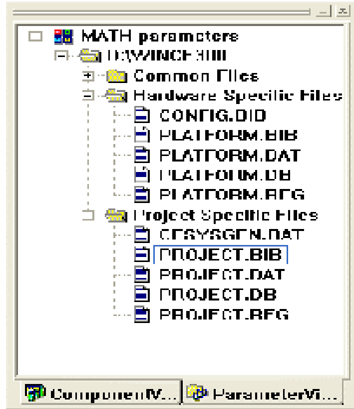
Note:

Select the **Touch Display [stylus]** into the platform. Users can see:
"Catalog\Core OS\Display based devices\Shell and User Interface\Touch Display[Stylus]"

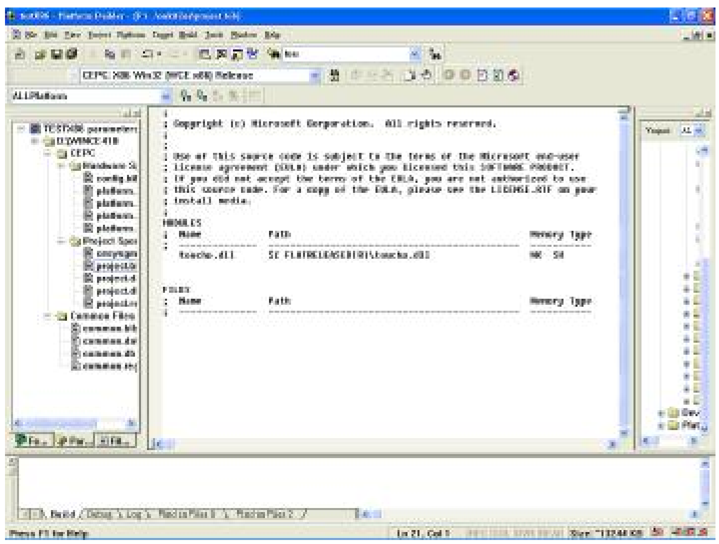
Select the **Mouse** into the platform. Users can see:
"Catalog\Core OS\Display based devices\Shell and User Interface\Mouse"



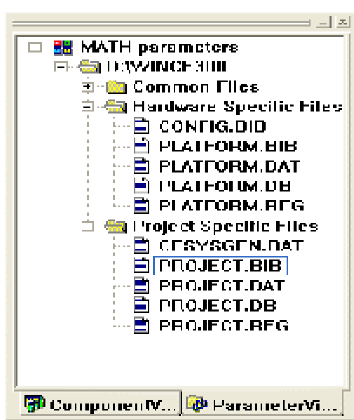
1. Create a sub-folder **"CEDB"** under **C:**
2. Copy files **USBPort.dll** and **Touchp.dll** to the directory.
3. Launch platform builder and open the platform workspace.
4. Edit the **PROJECT.BIB** in the Parameter View of Platform Builder.



5. Add this line in Modules:
   touchp.dll C:\CEDB\touchp.dll NK SH



6. Edit the **PROJECT.REG** in the Parameter View of Platform Builder.



7. Add these lines for registry:

[HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\TOUCH]

"DriverName"="Touchp.dll"

"CalibrationData"="102,102 1945, 102 1945,1945 102,1945"

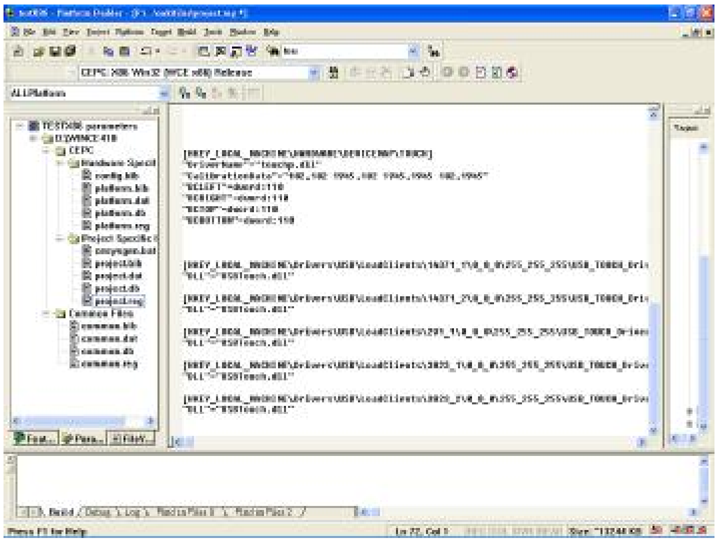
"COMM"="COM1:"

"BCLEFT"=dword:64

"BCRIGHT"=dword:64

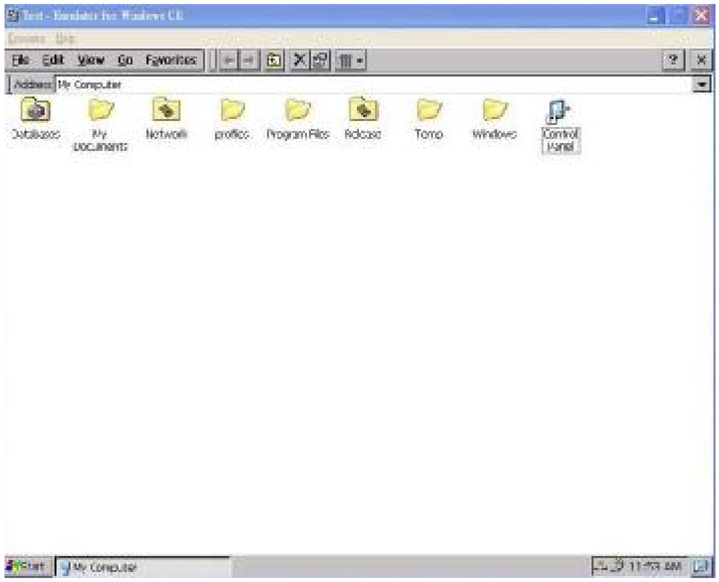
"BCTOP"=dword:64

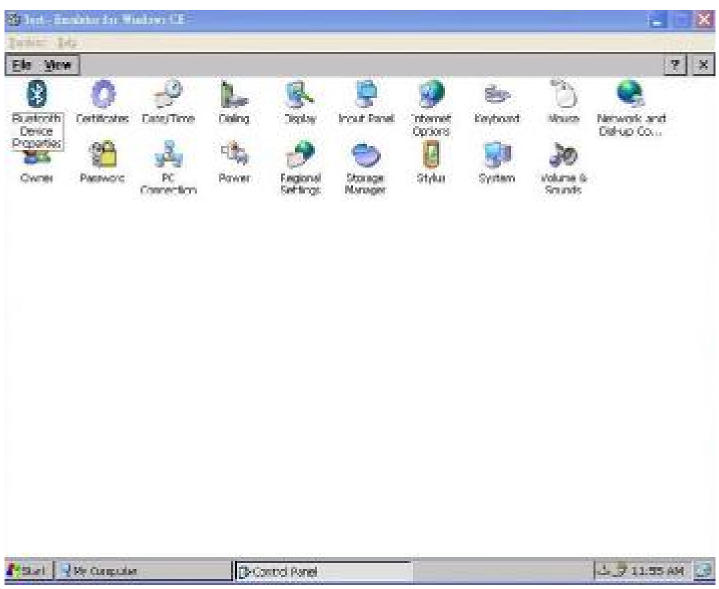
"BCBOTTOM"=dword:64



8. The setting of COMM is the COM users want to use, and users can setup it in the upper registry.

9. After building the image of CE.NET and load it to hardware platform. Users can use the stylus to do the calibration, which can be found in the control panel.







10. if the user wants to keep the calibration data after WINCE reboot, please write **WINCE REGISTRY** to FLASH or other storages on target.

2.3 For Windows CE.NET and CE 5.0

Touch driver installation with TouchKit utility. File List:

USBTouch.dll	- USB touch screen driver
TouchKit.dll	- RS232 touch screen driver
TouchKit.exe	- TouchKit utility
DrawTest.exe	- DrawTest utility
Calibration.exe	- Calibration utility
UpdateEEPROM.exe	- Update EEPROM utility

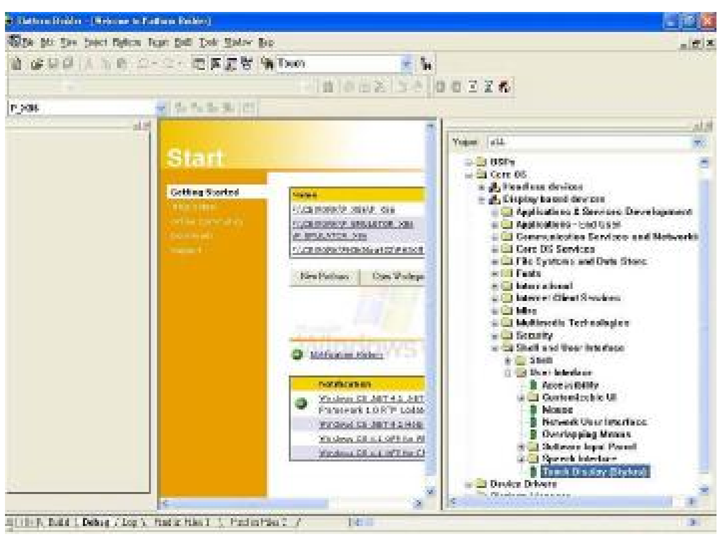
Note:

1. If users use USB controllers, users select the UHCI or OHCI USB Host Controller driver into the platform, which supported by the target device, and check the USB mouse can go well at the same port.

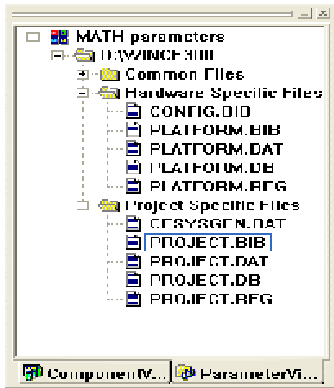
2. If users use RS232 controllers, users have to make sure Windows CE has the driver of serial port.

Select the “Mouse” into your platform. This can find in:

“Catalog\Core OS\Display based devices\Shell and User Interface\Mouse”



1. Create a sub-folder **“CEDB”** under **C:**
2. Copy files **USBTouch.dll**, **TouchKit.dll**, **TouchKit.exe**, **DrawTest.exe**, **Calibration.exe** and **UpdateEEPROM.exe** to the directory.
3. Launch platform builder and open the platform workspace.
4. Edit the **PROJECT.BIB** in the Parameter View of Platform Builder.



5. Add these two lines in Modules:

a) **TouchKit** utility:

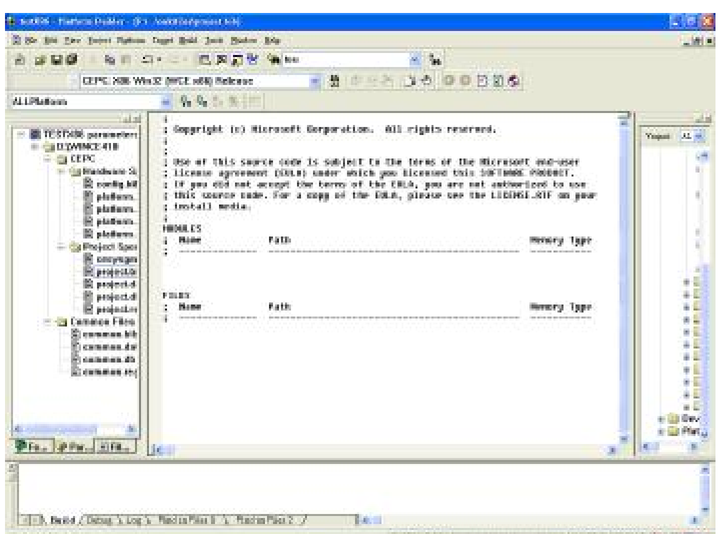
TouchKit.exe   C:\CEDB\TouchKit.exe   NK S
DrawTest.exe   C:\CEDB\DrawTest.exe   NK S
Calibration.exe   C:\CEDB\Calibration.exe   NK S
UpdateEEPROM.exe   C:\CEDB\Calibration.exe   NK S

b) If users want to use USB module:

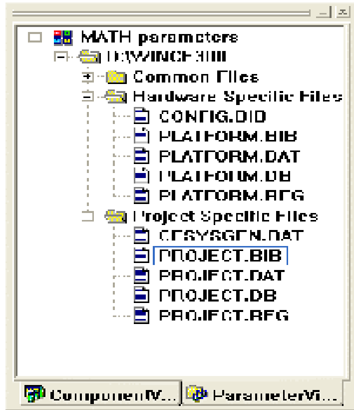
USBTouch.dll   C:\CEDB\USBTouch.dll   NK SH

c) If users want to use RS232 module:

TouchKit.dll   C:\CEDB\TouchKit.dll   NK SH



6. Edit the **PROJECT.REG** in the Parameter View of Platform Builder.



7. Add these lines for registry:

   a) Add the registry setting for all modules:

   [HKEY_LOCAL_MACHINE\Drivers\TouchKit]
   “RBSIZE”=dword:800
   “RBTIME”=dword:989680
   “FLAGS”=dword:1-------->set 0x1 sofware filter enable
   set 0x3000 update eeprom function enable
   “ZfilterThreshold”=dword:800
   “ZfilterBound”=dword:00100001
   “SoundType”=dword:0-------->This is the default sound type
   SoundType = 0 is no sound
   SoundType = 1 is Beep in touch down
   SoundType = 2 is Beep in lift off

   b) If users want to use USB module:

   [HKEY_LOCAL_MACHINE\Drivers\USB\LoadClients\14371_1\0_0_0\255_255_255\USB_TOUCH_Driver]
   “DLL”=”USBTouch.dll”
   [HKEY_LOCAL_MACHINE\Drivers\USB\LoadClients\14371_2\0_0_0\255_255_255\USB_TOUCH_Driver]
   “DLL”=”USBTouch.dll”
   [HKEY_LOCAL_MACHINE\Drivers\USB\LoadClients\4660_1\0_0_0\255_255_255\USB_TOUCH_Driver]
   “DLL”=”USBTouch.dll”

[HKEY_LOCAL_MACHINE\Drivers\USB\LoadClients\3823_1\0_0_0\255_255_255\USB_TOUCH_Driver]
“DLL”=”USBTouch.dll”
[HKEY_LOCAL_MACHINE\Drivers\USB\LoadClients3823_2\0_0_0\255_255_255\USB_TOUCH_Driver]
“DLL”=”USBTouch.dll”

c) If users want to use RS232 module1:
[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\TouchKit1]
“Dll”=”TouchKit.dll”
“Order”=dword:00000001
“Prefix”=”TKT”
“Index”=dword:00000001
“Context”=dword:1;---->This is the COM Port index which users use

If users want to use RS232 module2:
[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\TouchKit2]
“Dll”=”TouchKit.dll”
“Order”=dword:00000001
“Prefix”=”TKT”
“Index”=dword:00000002
“Context”=dword:2;---->This is the COM Port index which users use

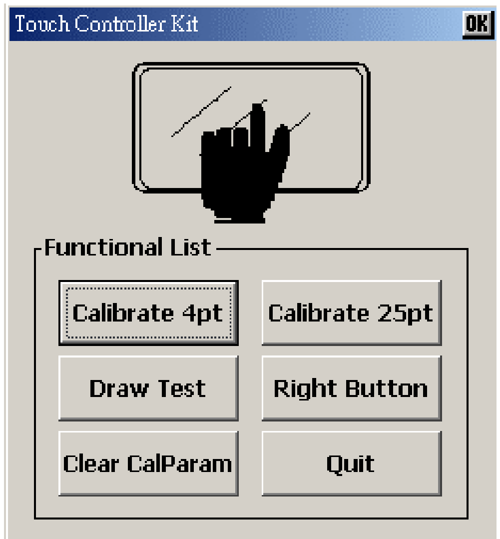
d) If users want to used other language for user’s utility:
#include "C:\CEDB\language_tch.reg"----------->Chose one language users want to use.

Chapter 3. Configuration Utility and Right Button Emulator

3.1 For Windows CE 2.12 / 3.0

Run **TouchKit.exe** file to execute it.

There are six buttons, **[Calibrate 4pt]**, **[Draw Test]**, **[Clear CalParam]**, **[Calibrate 4pt]**, **[Right Button]** and **[Quit]**, on the AP.



<Calibrate 4pt>

Correct 4 point locations on screen with the panel. Press on [Calibrate 4pt], screen displays as follows.



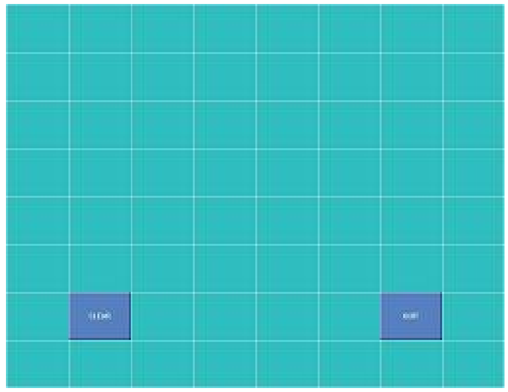
Touch the blinking symbol on panel until beep or stop blinking.

There will be a message window after this correction.

<Draw Test>

Test the drawing position related to the display screen on panel.

Click on the **[Draw Test]** button. There will be a squared blue display showing.



Try to write or draw on it to verify the touch position.

Press **[CLEAR]** for cleaning touch screen, and press **[QUIT]** to exit **Draw Test**.

<Clear CalParam>

Press **[Clear CalParam]** to clear the previous calibration records. The record will become default record.

<Calibrate 25pt>

Press **[Calibrate 25pt]** to execute 25 points calibration. Correct 25 point locations on screen with the panel.



Touch the blinking symbol on panel until beep or stop blinking.

After the calibration, the new record will overwrite the old one.

<RIGHT BUTTON>

Right mouse emulator. The default value is **on**.
Click **[Right Button]** to close the right mouse emulator.
Right Button starts with the computer booting. A mouse icon is located in the right corner of screen.
Click mouse right button; there will be a pop-up box. Select **Button**, then a squared box shows up.



Change right / left Button by click the icon on screen. Cyan area expresses what button has been selected.
After select the button, users can touch the panel to control mouse activities. Select / De-select files or Drag icons on screen, whatever the mouse behaves.

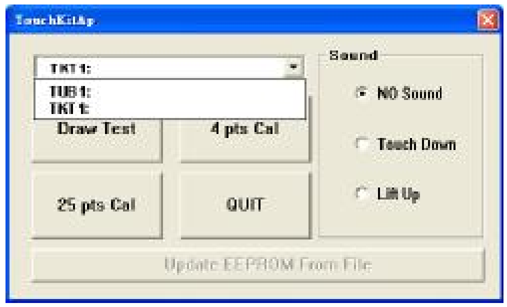
<Quit>

Exit **TouchKit** touch panel utility.

3.2 For Windows CE.NET

Run **TouchKit.exe** file to execute it. Before users do the calibration or draw test, the module has to be selected.

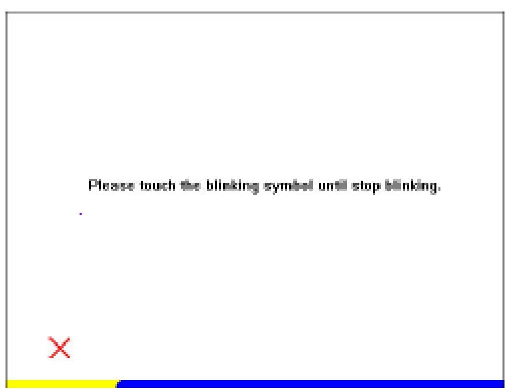
TUBX is the USB module
TKTX is the RS232 module



There are four functions, which are **[Calibrate 4pt]**, **[Draw Test]**, **[Calibrate 25pt]** and **[Quit]**.

<Calibrate 4pt>

Correct 4 point locations on screen with the panel. Press on [Calibrate 4pt], screen displays as follows.

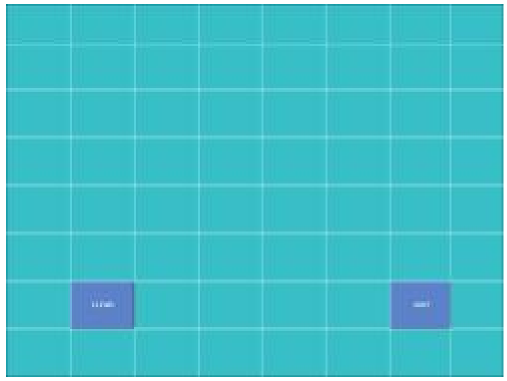


Touch the blinking symbol on panel until beep or stop blinking.
There will be a message window after this correction.

<Draw Test>

Test the drawing position related to the display screen on panel.

Click on the **[Draw Test]** button. There will be a squared blue display showing.



Try to write or draw on it to verify the touch position.

Press **[CLEAR]** for cleaning touch screen, and press **[QUIT]** to exit **Draw Test**.

<Calibrate 25pt>

Press **[Calibrate 25pt]** to execute 25 points calibration. Correct 25 point locations on screen with the panel.



Touch the blinking symbol on panel until beep or stop blinking.

After the calibration, the new record will overwrite the old one.

<Sound>

No sound

Users could choose to make no sound while using the touch panel.



Touch Down

The system will make sound while touching the panel.



Life Up

The system will not make any sound until finger leaves the touch panel.



<Right Button>

If the users want to emulate right button, the users can touch and keep the finger on the panel for two to three seconds. The last touch will be emulated the mouse right button. The users can change the waiting time and the stop size in registry value **“RBTIME”** and **“REVALUE”**.

<Quit>

Exit **TouchKit** touch panel utility.